CLAIMS

1. A method of controlling peak firing pressure and turbine inlet temperature in a diesel engine having a turbocharger, the method comprising:

sensing inlet charge air pressure and charge air temperature;

obtaining fuel injection timing, engine speed and load;

determining current peak firing pressure;

computing charge air density and turbine inlet temperature;

transmitting charge air density, turbine inlet temperature and peak firing pressure to an electronic bypass valve control unit (BVCU);

comparing transmitted values of turbine inlet temperature and peak firing pressure with allowable maximums of these values stored in the BVCU; and

controlling the bypass valve to divert a sufficient portion of compressed air from a compressor outlet around the engine to maintain at least one of peak firing pressure and turbine inlet temperature within maximum allowable values.

2. A method as in claim 1 wherein the obtaining step includes obtaining the fuel injection timing, engine speed and load from an engine control unit.

3. A method as in claim 1 wherein the determining step includes measuring the peak firing pressure.

4. A method as in claim 1 wherein the determining step includes computing the peak firing pressure.

5. A method as in claim 4 wherein the peak firing pressure is computed from engine geometry, engine speed, computed charge density and fuel injection timing.

6. A method as in claim 1 wherein the turbine inlet temperature is computed from computed charge air density, engine speed, engine load and fuel injection timing.

7. A method as in claim 1 including:

determining the value of NOx exhaust emissions and transmitting the value to the BVCU, and

controlling the bypass valve to divert a sufficient portion of compressed air from the compressor outlet around the engine to maintain NOx exhaust emissions within maximum allowable values stored in the BVCU.

8. A method as in claim 1 including:

determining the value of visible exhaust smoke;

transmitting the value to the BVCU, and

controlling the bypass valve to divert a sufficient portion of compressed air from the compressor outlet around the engine to maintain allowable smoke emissions within maximum allowable values stored in the BVCU.

9. A method as in claim 1 including conducting compressed air diverted around the engine to a turbine inlet of the turbocharger to utilize the energy in the diverted gas to maintain compressor speed while reducing the temperature of exhaust gas driving the turbine.

10. A method as in claim 1 including conducting compressed air diverted around the engine to an engine exhaust outlet to maximize the effectiveness of the controlling step.